WEATHER, FORECASTS, AND WARNINGS, JANUARY, 1911.

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The year 1910 closed with a well defined depression over southwestern Kansas, the low pressure area extending northeastward from western Kansas to Lake Superior. Over the eastern portion of the country the pressure was abnormally high with moderate temperatures, while over the Northwest another high area was building rapidly, with temperatures ranging from zero in South Dakota to 22° below zero in the British northwest. On the morning of January 1, 1911, the center of the disturbance had reached southeastern Kansas with general rains and higher temperatures to the eastward and southeastward, and snows and still lower temperatures to the northward and northwestward. The following bulletin was then issued:

A disturbance that was over the Mississippi Valley Sunday will advance eastward and reach the Atlantic coast by Monday night; it will be attended by stormy weather Monday in the region east of the Mississippi River with rains changing to snows in the Central and Northern States and rains in the Southern States. Rain or snow will probably continue Monday night in the Atlantic States. Following this disturbance, a cold wave of marked severity will move eastward to the Atlantic States by Monday night or Tuesday and southward to the Gulf States during Sunday night or Monday. Temperatures attending this cold wave will be considerably below freezing in the Gulf and South Atlantic States and probably in Florida, except the extreme southern portion. Further advices will be telegraphed Monday, confirming or modifying this forecast for Florida, to all interests likely to be affected by a severe cold wave in that State.

The next storm area will appear on the Pacific coast Tuesday, and advance eastward, preceded by rising temperature and attended by general precipitation; it will cross the Middle West Wednesday or Thursday and reach the Atlantic States by Friday or Saturday.

On the morning of Monday, January 2, 1911, the storm center was over Lake Superior with a cold wave extending through the Plains States and the upper Mississippi Valley. The following special bulletin was issued:

The cold wave that opened the present year in the Northwest was the most severe of the season. It follows a disturbance that moved down the eastern slope of the Rocky Mountains to western Kansas and from thence northeastward to Lake Superior where it was central Monday morning, attended by general snows and rain over the eastern half of the country. In the meantime a high-pressure area of great magnitude has overspread the entire West and the cold wave now covers the whole interior of that section, with a temperature of 4° below zero Monday morning in the Texas Panhandle and a low reading of 38° below zero at Havre, Mont. High northwest winds accompanied the cold weather, and considerable snow occurred in the upper Mississippi Valley and the upper Lake region.

Cold wave warnings were first ordered Friday night and since that time they have been extended southward and eastward as occasion required. This morning they are displayed over the entire country east of the Mississippi River, the upper Lake region, and southern Texas. The cold wave will maintain its severe character and temperatures below the freezing point may be expected by Wednesday morning well into southern Florida, while over the middle and northern districts they will range from zero to probably as much as 20° or 25° below over the extreme northern districts.

The cold wave will continue in the East for several days, and it will be accompanied at first by high west to northwest winds for which warnings are now displayed on the Atlantic and Gulf coasts.

On the morning of January 3, 1911, the cold wave covered the great interior basin of the country with freezing temperature in extreme northwestern Florida, and a temperature of 12° below the freezing point on the northeastern Texas coast. At the same time temperatures in Minnesota and the eastern Dakotas ranged from 22° to 30° below zero. By the following morning (January 4) the cold weather had extended to the Atlantic coast, although its severity was much tempered by the persistence of the strong high pressure area over the south Atlantic Ocean. In the Southern States, however, the cold increased, and the following low temperatures were reported: Corinth, Miss., 2° below zero; Pensacola, Fla., 18° above zero; Jacksonville, Fla., 32° above zero. On the morning of January 5, the lowest temperature at Jacksonville was 26°, and freezing temperature occurred below Tampa, Fla.

It does not appear that any great damage was done by the cold wave in the South and Southwest. The cattle men in Texas suffered some loss, but the crop and fruit damage was comparatively small. This was largely due to the timeliness of the Weather Bureau warnings which enabled the growers to take proper precautionary measures. In commenting upon the use of smudges to protect some orange groves in southern Louisiana, the New Orleans Picayune remarked as follows:

This is only one instance in a thousand where the efficiency of the Weather Bureau Service was directly responsible for the saving of a magnificent crop of one of Louisiana's proudest products.

The rains that preceded this cold continued for three days and were sufficiently heavy in the South Atlantic and east Gulf States to cause floods in the rivers. Storm warnings were ordered on January 2 along the Atlantic and east Gulf coasts for the moderately high winds that followed during the day and night of January 3.

On January 3 another marked depression appeared in the British northwest. It moved eastward along the northern boundary of the United States, attended by light snows, but without temperature changes of consequence.

From December 26 to 30, inclusive, 1910, the pressure at Honolulu fell steadily, and on the morning of January 2, 1911, the pressure was low over Alaska, with barometer readings of 29.20 and 29.28 inches at Nome and Tanana, respectively. By the evening of January 4 this disturbance had moved southeastward to Alberta, from which section it continued southeastward to Iowa and thence eastward, attended by snows over the northern districts and rising temperatures that extended eastward to the Atlantic.

A series of moderate depressions followed, the last one appearing over Alberta on the night of the 6th. This also moved southeastward with very definite formation and attended by snows in its immediate vicinity. It turned eastward after reaching South Dakota, and from thence moved almost directly eastward, reaching the Canadian maritime provinces on the evening of January 9. Some high winds attended the storm, for which

warnings were displayed on January 8 and 9 from Delaware Breakwater to Eastport. Temperatures preceding this storm were much above the seasonal average, and the succeeding high area was accompanied by a marked fall in temperature which extended to the Atlantic coast by the morning of January 10. However, no low temperatures were reported except in the upper Mississippi Valley on the morning of January 9, for which cold-wave warnings were ordered on the previous morning. Farther to the eastward temperatures did not fall as much as had been anticipated.

From January 7 to 9, inclusive, low pressure again prevailed over the western Pacific, and by the morning of the 9th the pressure was abnormally low from the north coast to western Montana, the barometer at North Head, Wash., reading 29.16 inches. On the previous day pressure was very high over western Alaska, with a temperature of 52° below zero at Eagle. On the morning of Sunday, January 8, the special weekly bulletin stated that the severe cold wave that was then over Alaska would overspread the northwestern States Monday and Tuesday and later advance eastward and southward. The bulletin also stated that the disturbance that then prevailed over the extreme west would be attended by widespread precipitation over that section, including California, where the season's rainfall had been greatly deficient. This storm was very severe along the north Pacific coast and at Grays Harbor, Wash., the wind reached an estimated velocity of 90 to 100 miles an hour during the night of January 8. At Tatoosh Island, Wash., the highest wind velocity was 56 miles an hour from the southeast. Storm warnings were ordered a day in advance of the gale, and no shipping disasters were reported.

The rains and snows occurred as forecast as far south as the Mexican border. In the mountains the snowfall was very heavy, and railroad traffic was much impeded. The rains and snows continued throughout the week, and snow fell along the North Pacific coast from January 10 to 12, inclusive. The storm center did not cross the Rocky Mountains, but pressure continued low over the northwestern districts until the end of the week.

The southeastern movement of the northwestern cold wave was effectually retarded by a high pressure area of great magnitude that prevailed over the Atlantic Ocean and the Southern States, and it did not extend eastward beyond Minnesota and western Iowa and southward beyond Kansas, although it persisted during the entire time from January 9 to 15, inclusive, with thermometer readings as low as 16° below zero at Duluth, Minn., 36° below at Havre, Mont., and 50° below in northern Saskatchewan. Low temperature also continued in Alaska until January 13. A trough of relatively low pressure formed between the southeastern and northwestern high areas, which resulted in unsettled weather and rain, sleet, and snow from the upper Mississippi Valley eastward to the coast. The rains were accompanied by high temperatures, and both continued with brief interruptions from January 11 to 15, inclusive.

On Sunday, January 15, the following bulletin was issued:

An area of high barometric pressure that now covers the Middle West will advance eastward and cause generally fair weather the first part of the week in the eastern districts and a change to moderately low temperatures Monday and Tuesday over the Northern and Middle States east of the Mississippi Valley. A disturbance of considerable intensity will appear on the North Pacific coast by Monday and move eastward, crossing the Middle West the middle of the week and the Atlantic States Thursday or Friday; this disturbance will be preceded by rising temperature, attended by widespread precipitation, and be followed by a general change to colder weather.

The week beginning with Monday, January 16, was characterized by unsettled weather with occasional snows and rains which, however, did not extend into New England and the north portion of the Middle Atlantic States until the end of the week, when the Pacific disturbance noted in the bulletin of January 15 reached the St. Lawrence Valley. Temperatures rose rapidly in advance of this disturbance, and the succeeding fall was equally rapid, although no unusually low temperatures were recorded. On Friday, January 20, a disturbance formed over eastern Colorado and moved southeastward to Arkansas and from thence eastward off the North Carolina coast. This disturbance, with the high area northward, caused general snows over the Ohio Valley and light local rains in the South. It was followed by a decided temperature fall in the South to more normal conditions, and a further fall in New England and the Middle Atlantic States. Rains continued throughout the week on the North Pacific coast, and during January 19 and 20 they extended southward through California. Conditions were also unsettled on January 20 and 21 over the middle and northern interior districts west of the Rocky Mountains with general, although mostly light, snows. A moderate cold wave occurred near the end of the week over portions of the Northwest for which warnings were issued at the proper time.

From January 17 to 20, inclusive, low pressure again prevailed over Honolulu and thence northward to southern Alaska, indicating the approach of another disturbance toward the Pacific coast, and on the morning of January 22 the following bulletin was issued:

The general pressure distribution over the North American Continent and the adjacent oceans is such as to indicate that temperatures during the coming week will average near or above the normal in practically all districts, preceded, however, by moderately low temperatures the first part of the week in the eastern and southern districts. A change to colder weather will overspread the Northwestern States the latter part of the week. The principal disturbance of the week will appear on the Pacific coast Tuesday or Wednesday, cross the Middle West Thursday or Friday and the Eastern States the last of the week; this disturbance will be preceded by rising temperature and accompanied by general precipitation.

By the morning of January 24 the pressure at Sitka had fallen to 29.30 inches, and by evening a reading of 29.44 inches was made at Tacoma, Wash. High winds occurred along the north coast, for which the usual warnings were issued. The history of this disturbance is very similar to that of the one that crossed the country during the second week of the month. Rains, with comparative low pressure, were general in the Coast States during the entire week ending January 28, and there were frequent rains and snows in the interior plateau districts. The disturbance drifted eastward, losing its definite character after crossing the Rocky Mountains until the lower Lake region was reached during January 27, when there was another development, and during January 28 a well-defined storm passed out of the lower St. Lawrence Valley, attended by high winds on the north coast, for which warnings were ordered on the morning of January 28. There was but little precipitation from the disturbance between the Mississippi River and the Rocky Mountains, but over the northern and central districts to the eastward rains and snows and high temperatures were general, beginning on Wednesday, January 25, in

the Mississippi Valley, and reaching the Atlantic coast on January 27 and 28. Pressure was again high over the Atlantic and the cold following the western disturbance was therefore not pronounced, the line of zero temperature not extending eastward beyond Minnesota, this notwithstanding the fact that abnormally high pressure and low temperatures prevailed over interior Alaska during the first half of the week (Eagle, barometer 30.86; temperature 62° below zero). As a consequence cold-wave warnings for the Northwest were not verified except in a few localities.

On January 24 and 25 a well-defined depression was central over southwestern Alaska. It was held by the strong high area to the eastward and did not reach the northern Rocky Mountains until the morning of January 28. It then moved almost due eastward with great rapidity and increased development, passing off the northeast Canadian coast during the night of January 30, with a barometer reading of 28.86 inches at Sidney. This storm was attended by general rains and snows over the middle and northern districts from the Mississippi Valley eastward, and was followed by a moderate cold wave over the northern tier of States. Severe west and northwest gales were also experienced and the usual warnings for the lakes and the Atlantic coast were ordered on January 29, the high winds occurring mainly on the following day. The rains that fell during January 29 over the upper Ohio were in sufficient quantity to cause the first flood of the season, and warnings were at once issued. At the end of the month the crest of the flood had just reached Parkersburg, W. Va., with a stage slightly above the flood stage.

On the morning of Sunday, January 29, the following bulletin was issued:

The coming week promises to be one of unsettled weather, with considerable precipitation over much of the country. A change to colder weather will overspread the greater part of the country east of the Rocky Mountains during the first part of the week, following the eastward movement of a disturbance that was over the Middle West on Sunday.

The principal disturbance of the week will prevail during the next several days west of the Rocky Mountains, whence it will move eastward and cross the Middle West Thursday or Friday and the Atlantic States the latter part of the week. This disturbance will be preceded by rising temperature, attended by general precipitation, and be followed by considerably colder weather in the northern and central districts east of the Rocky Mountains.

The disturbance appeared on the Pacific coast during the night of January 30 and at the end of the month it was still centered over the western slope of the northern Rockies, with continued rains to the westward and a general sharp pressure fall to the eastward.

Three features of the month's weather stand out prominently: (1) The unvarying persistence of the South Atlantic high-pressure area which effectually retarded the normal eastward movement of three strong disturbances and of the cold high-pressure areas following. (2) The long duration and excessive quantity of precipitation in California after a prolonged period of dry conditions. These rains began during the night of January 8–9 and continued with but five or six days' interruption until after the end of the month. The fall was frequently excessive and severe floods were experienced in portions of the Sacramento and lower San Joaquin Rivers and their tributaries. (3) The abnormally high temperatures that prevailed over the Southwest and in the lower Missouri, middle and lower Mississippi, and lower Ohio Valleys during the last days of the month. At Fort Worth, Tex., the maximum temperature of 94° was the highest temperature ever recorded at a regular Weather Bureau station during the month of January, while at many other places in the districts mentioned the temperatures were the highest of record at those places for the month of January.

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperature for the current month.	Departures for the current month.	Accumulated departures since Jan. 1.	Average departures since Jan. 1.
New England	12	27.7	+3.3	.....	.....
Middle Atlantic	15	36.1	+4.8	.....	.....
South Atlantic	10	49.8	+4.6	.....	.....
Florida Peninsula[1]	8	63.3	+4.1	.....	.....
East Gulf	11	53.7	+6.3	.....	.....
West Gulf	10	53.6	+8.1	.....	.....
Ohio Valley and Tennessee	13	39.3	+5.9	.....	.....
Lower Lakes	10	27.4	+3.3	.....	.....
Upper Lakes	12	19.8	+1.8	.....	.....
North Dakota[1]	8	− 2.3	−7.1	.....	.....
Upper Mississippi Valley	14	24.8	+3.2	.....	.....
Missouri Valley	12	26.5	+5.4	.....	.....
Northern slope	9	21.1	+2.1	.....	.....
Middle slope	6	36.8	+7.8	.....	.....
Southern slope[1]	8	47.7	+7.8	.....	.....
Southern Plateau[1]	11	44.6	+5.1	.....	.....
Middle Plateau[1]	10	29.9	+5.5	.....	.....
Northern Plateau[1]	10	28.9	+0.9	.....	.....
North Pacific	7	37.9	−1.6	.....	.....
Middle Pacific	5	47.8	+0.6	.....	.....
South Pacific	4	54.0	+3.2	.....	.....

[1] Regular Weather Bureau and selected cooperative stations.

Average precipitation and departures from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
New England	11	2.52	72	−1.0	.....
Middle Atlantic	15	3.10	97	−0.1	.....
South Atlantic	10	1.46	38	−2.4	.....
Florida Peninsula[1]	8	0.99	34	−1.9	.....
East Gulf	11	3.16	64	−1.8	.....
West Gulf	10	0.47	16	−2.5	.....
Ohio Valley and Tennessee	13	3.77	97	−0.1	.....
Lower Lakes	10	2.46	92	−0.2	.....
Upper Lakes	12	1.43	70	−0.6	.....
North Dakota[1]	8	0.99	168	+0.4	.....
Upper Mississippi Valley	15	1.34	77	−0.4	.....
Missouri Valley	12	0.39	39	−0.6	.....
Northern slope	9	1.21	170	+0.5	.....
Middle slope	6	0.11	15	−0.6	.....
Southern slope[1]	8	0.24	26	−0.7	.....
Southern Plateau	11	1.46	152	+0.5	.....
Middle Plateau	10	1.95	170	+0.8	.....
Northern Plateau	10	1.42	83	−0.3	.....
North Pacific	7	6.27	94	−0.4	.....
Middle Pacific	7	10.93	236	+6.3	.....
South Pacific	4	7.15	260	+4.4	.....

[1] Regular Weather Bureau and selected cooperative stations.

Average relative humidity and departure from the normal.

Districts.	Average.	Departure.	Districts.	Average.	Departure.
New England	74	− 2	Missouri Valley	77	+ 1
Middle Atlantic	75	− 1	Northern slope	74	+ 3
South Atlantic	79	+ 2	Middle slope	63	− 4
Florida Peninsula	85	+ 4	Southern slope	59	− 7
East Gulf	77	− 1	Southern plateau	63	+13
West Gulf	74	− 2	Middle plateau	73	+ 3
Ohio Valley and Tennessee	79	+ 2	Northern plateau	69	−11
Lower lakes	79	− 2	North Pacific	87	+ 2
Upper lakes	84	+ 1	Middle Pacific	81	0
North Dakota	89	+ 9	South Pacific	69	− 3
Upper Mississippi Valley	81	+ 3			

Average cloudiness and departure from the normal.

Districts.	Average.	Departure.	Districts.	Average.	Departure.
New England	6.7	+0.8	Missouri Valley	6.5	+1.5
Middle Atlantic	6.3	+0.5	Northern slope	5.8	+0.7
South Atlantic	5.1	−0.2	Middle slope	5.4	+1.3
Florida Peninsula	3.9	−0.9	Southern slope	5.1	+0.7
East Gulf	5.8	+0.1	Southern plateau	4.6	+1.2
West Gulf	5.9	+0.6	Middle plateau	6.2	+1.1
Ohio Valley and Tennessee	7.5	+1.1	Northern plateau	7.7	+1.0
Lower lakes	7.5	+0.1	North Pacific	8.3	+0.8
Upper lakes	7.1	+0.2	Middle Pacific	6.3	+0.7
North Dakota	5.8	+0.9	South Pacific	5.6	+1.1
Upper Mississippi Valley	7.4	+2.0			

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Bismarck, N. Dak.	3	60	nw.	New York, N. Y.	30	66	nw.
Block Island, R. I.	16	55	nw.	North Head, Wash.	8	78	s.
Do.	28	63	nw.	Do.	9	64	sw.
Do.	30	66	w.	Do.	16	70	se.
Do.	31	63	nw.	Do.	17	52	s.
Buffalo, N. Y.	5	62	w.	Do.	23	54	se.
Do.	8	65	w.	Do.	24	52	s.
Do.	9	64	w.	Do.	25	50	s.
Do.	19	54	w.	Do.	26	58	se.
Do.	30	53	w.	Do.	27	76	s.
Burlington, Vt.	21	54	s.	Pittsburg, Pa.	8	54	w.
Cheyenne, Wyo.	7	60	w.	Pt. Reyes Light, Cal.	1	50	nw.
Chicago, Ill.	8	62	sw.	Do.	11	56	s.
Cleveland, Ohio.	8	60	sw.	Do.	12	62	sw.
Do.	9	50	w.	Do.	13	61	s.
Do.	30	50	w.	Do.	19	51	s.
Columbus, Ohio.	8	60	w.	Do.	27	53	s.
Denver, Colo.	7	51	w.	Providence, R. I.	28	60	nw.
Detroit, Mich.	8	60	w.	Do.	30	54	nw.
Do.	9	56	nw.	Pueblo, Colo.	20	50	w.
Duluth, Minn.	10	63	nw.	St. Paul, Minn.	29	52	nw.
Grand Haven, Mich.	8	56	w.	Salt Lake City, Utah	10	60	n.
Indianapolis, Ind.	8	54	w.	Seattle, Wash.	9	55	s.
Lewiston, Idaho.	9	52	w.	Sheridan, Wyo.	5	50	nw.
Modena, Utah.	10	56	sw.	Sioux City, Iowa.	2	54	nw.
Mt. Tamalpais, Cal.	2	50	ne.	Do.	5	50	nw.
Do.	6	53	ne.	Do.	8	56	nw.
Do.	8	58	sw.	S'east Farallon, Cal.	1	54	n.
Do.	11	55	sw.	Do.	13	50	s.
Do.	12	50	sw.	Syracuse, N. Y.	28	57	nw.
Do.	19	57	sw.	Do.	30	56	nw.
Do.	20	59	sw.	Tatoosh Isl., Wash.	8	66	se.
Mount Weather, Va.	9	74	w.	Do.	9	50	sw.
Do.	15	58	nw.	Do.	13	50	ne.
Do.	16	62	nw.	Do.	16	62	se.
Do.	28	62	w.	Do.	23	56	s.
Do.	30	66	w.	Do.	24	52	s.
New York, N. Y.	9	52	w.	Toledo, Ohio.	8	61	sw.
Do.	16	50	nw.	Winnemucca, Nev.	11	50	nw.
Do.	28	58	nw.				